

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-150-2
Relating to Exemptions under Section 27156
of the Vehicle Code

K.F. INDUSTRIES, INC.
MAX-25 SUPERCHARGER KIT

Pursuant to the authority vested in the Air Resources Board by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-5;

IT IS ORDERED AND RESOLVED: That the installation of the MAX-25 supercharger kit model No. 510-9517408-1 manufactured by K.F. Industries, Inc. has been found not to reduce the effectiveness of required motor vehicle pollution control devices and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for all 1986-1988 model-year Chevrolet and GMC light-duty trucks powered by a GMC 2.8 liter V-6 gasoline fuel-injected engine.

Modifications to the OEM emission-related parts due to the installation of the supercharger kit include replacement of the fuel-injectors with GM part number 17111694, replacement of the Electronic Control Module (ECM) PROM with K.F. Industries #KF-18 PROM and the addition of spring loaded door to the OEM air cleaner assembly.

All other original equipment emission control devices must be retained. The vehicle must be tuned to the vehicle manufacturer's specifications.

Changes made to the design or operating conditions of the device, as exempted by the Air Resources Board, that adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

This exemption shall not apply to any device, apparatus, or mechanism advertised, offered for sale or sold with, or installed on, a motor vehicle prior to or concurrent with transfer to an ultimate purchaser.

Marketing of this device using an identification other than that shown in this Executive Order or marketing of this device for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board. Exemption of a kit shall not be construed as an exemption to sell, offer for sale, or advertise any component of a kit as an individual device.

This Executive Order does not constitute any opinion as to the effect that the use of this device may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF THE MAX-25 SUPERCHARGER KIT.

No claim of any kind, such as "Approved by Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

Section 17500 of the Business and Professions Code makes untrue or misleading advertising unlawful, and Section 17534 makes violation punishable as a misdemeanor.

Section 43644 of the Health and Safety Code provides as follows:

"43644. (a) No person shall install, sell, offer for sale, or advertise, or, except in an application to the state board for certification of a device, represent, any device as a motor vehicle pollution control device for use on any used motor vehicle unless that device has been certified by the state board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as a certified device which, in fact, is not a certified device. Any violation of this subdivision is a misdemeanor."

Any apparent violation of the conditions of this Executive Order will be submitted to the Attorney General of California for such action as he deems advisable.

Executed at El Monte, California, this 18th day of September, 1987.



K. D. Drachand, Chief
Mobile Source Division

State of California
AIR RESOURCES BOARD

EVALUATION OF K. F. INDUSTRIES, INC.'s MAX-25 SUPERCHARGER
KIT FOR EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE
SECTION 27156 IN ACCORDANCE WITH SECTION 2222,
TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

September, 1987

Date of Issue: September, 1987

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TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

by
Mobile Source Division

State of California
AIR RESOURCES BOARD
9528 Telstar Avenue
El Monte, CA 91731

(This report has been reviewed by the staff of the California Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.)

SUMMARY

K. F. Industries, Inc. (KFI) has applied for exemption from the prohibitions in Vehicle Code Section 27156 for their MAX-25 supercharger kit designed for 1986-1988 model-year Chevrolet and GMC light-duty trucks powered by a 2.8 liter V-6 gasoline fuel-injected engine.

Based on the results from comparative exhaust emissions tests performed by K. F. Industries, at an independent laboratory, on a 1987 GMC S15 4x4 pick-up truck and from confirmatory tests performed at the Haagen-Smit Laboratory, the staff concludes that the K. F. Industries, Inc. MAX-25 supercharger kit will not adversely affect emissions from the vehicles described above.

The staff recommends that K. F. Industries, Inc. be granted an exemption as requested and that Executive Order D-150-2 be issued.

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EVALUATION OF K. F. INDUSTRIES, INC.'S MAX-25 SUPERCHARGER KIT FOR EXEMPTION FROM THE PROHIBITIONS IN VEHICLE CODE SECTION 27156 IN ACCORDANCE WITH SECTION 2222, TITLE 13, OF THE CALIFORNIA ADMINISTRATIVE CODE

I. INTRODUCTION

K. F. Industries, Inc., (KFI) of Sun Valley, California 91353, has requested an exemption from the prohibitions in Vehicle Code Section 27156 for their MAX-25 supercharger kit. The supercharger kit is designed for installation on 1986-1988 model-year Chevrolet and GMC light-duty trucks powered by a 2.8 liter V-6 gasoline fuel-injected engine.

KFI has submitted data from comparative (stock baseline vs. supercharged) emissions tests conducted on a 1987 GMC S-15 4x4 pick-up truck at Import Certification Laboratories, Inc., Orange, California. Confirmatory tests were conducted on the same vehicle at the Haagen-Smit Laboratory in El Monte, California.

II. CONCLUSION

Based on the results from comparative exhaust emissions tests performed by KFI, at an independent laboratory on a 1987 GMC S-15 4x4 pick-up truck, and from confirmatory tests performed by the ARB on the same vehicle, the staff concludes that KFI's supercharger kit will not adversely affect exhaust emissions from the vehicles described above.

III. RECOMMENDATIONS

The staff recommends that KFI be granted an exemption for their add-on MAX-25 supercharger kit and that Executive Order D-150-2 be issued.

IV. SUPERCHARGER KIT DESCRIPTION

The MAX-25 Supercharger Kit has been specifically designed for installation on the 1986-1988 GMC 2.8 liter, V-6 gasoline fuel-injected engine. The kit operates in conjunction with the OEM throttle body

fuel-injection and the emission control systems already certified with the stock engine. All the necessary hardware and supplies are included in the kit. Some of the OEM parts are removed and discarded to be replaced by custom parts supplied with the kit. A complete manual describing the parts, and step-by-step installation procedures is supplied with the kit (see Appendix 1).

The supercharger (Model No. 510-9517408-1) is belt driven at 2.0 times the speed of the engine which provides 5 psig of boost at 5000 rpm. To provide additional fuel to maintain proper air-fuel ratios during boost conditions, larger fuel injectors are installed in the OEM throttle body. A spring loaded door is added to the air cleaner assembly to allow for additional air flow during boost conditions.

The Electronic Control Module (ECM) PROM is replaced with a KFI PROM which calibrates the ECM to perform in conjunction with the supercharger. All functions of the ECM are maintained, however, they are slightly modified by the KFI PROM. Cold-start, EGR control, fuel control, and spark control are modified to maintain acceptable emissions from the supercharged vehicle. The KFI PROMs are identified by the OEM GM part numbers they replace and the designation "KF-18" (see Appendix 2).

A noticeable power improvement is achieved and driveability remains good. Fuel economy is slightly reduced but emissions remain at or below baseline levels.

In addition to the standard kit identification label required by the ARB for exempted aftermarket parts, KFI will supply an additional sticker to be attached to the ECM stating that the PROM has been changed so that if there is a PROM failure the KFI PROM must be installed instead of the OEM PROM which may cause engine damage if used in conjunction with the supercharger (see Appendix 3).

V. SUPERCHARGER KIT EVALUATION

A 1987 GMC S-15 4x4, light-duty pick-up truck with a 2.8 liter, V-6 gasoline fuel-injected engine was used for the evaluation of the supercharger kit. The dynamometer inertia weight and loading used were 4000 lbs. and 11.8 hp, respectively.

Comparative emissions tests conducted by Import Certification Laboratories, Inc. for KFI and by the ARB, consisted of back-to-back cold-start CVS-75 emissions tests and hot-start Highway Fuel Economy tests. These tests were used to determine exhaust emissions in the unmodified (baseline) and supercharged (device installed) configurations for comparison. A summary of the test results is shown below:

Exhaust Emissions Test Results On A 1987 GMC S-15 4x4 Pick-Up Truck

A. Applicants Test Results

Test Mode	Exhaust Emissions (gm/mi)				Fuel Economy (mpg)	
	HC	CO	NOx	Highway NOx	City	Highway
Baseline	0.31	6.23	0.55	0.10	16.8	26.3
Device	0.25	5.50	0.48	0.06	13.8	23.7

B. Confirmatory Test Results

Baseline	0.26	5.40	0.71	0.14	16.9	26.7
	0.26	4.86	0.72	0.15	17.2	26.3
Average	0.26	5.13	0.72	0.15	17.1	26.5
Device	0.27	6.55	0.51	0.07	14.4	23.7
	0.22	3.97	0.54	0.09	14.4	23.5
	0.26	5.97	0.42	0.07	14.3	23.6
Average	0.25	5.50	0.49	0.08	14.4	23.6

California Standards: HC = 0.39; CO = 9.00; NOx = 1.00
(all in grams per mile).

VI. DISCUSSION

The results of the exhaust emissions tests performed on the test vehicle show no significant increase in emissions due to the installation of the supercharger kit. KFI has fulfilled the requirements for the exemption and therefore Executive Order D-150-2 should be issued.

86-88 S1(2.8R) W/AT MDS ZW9 CALIF.	7365 BC 7365 ASN 0333 ASN.	16060332
86 T1 2.8R W/AT MDS ZW9 CALIF.	7365 SC 7365 ASN 0333 ASN	16060332
86-88 ST-1(2.8R) W/MT (ML-2 ML-3) 411R CALIF.	7360 RX 7360 ASM 0333 ASN	16060336
86-88 SFI 2.8R W/MT(ML-2 ML-3) 3.08R 342R 373R CALIF	7354 RW 7354 ASL 0340 ASL	16060339
86-88 S108 2.8R W/AT (MDS) ZW9 (EXC CALIF)	7349 RP 7349 ASJ	16060343
86-88 S108(03)(2.8R) W/MT MC-9 M73 FED ZW9	7345 RK 7345 ASD 0340 ASD	16060347
86-88 ST-1(2.8R) W/MT(ML-2 ML-3) NM-8 EXPORT	7383 SL 7383 ATA 0352 ATA	16060350
86-88 ST1(2.8R) W/AT (MDS) EL3 (EXC CALIF NM8 EXP)	0356 ARW	16060355
87-88 T1(2.8R) W/AT MDS (EXC CALIF NM8 EXP)	0356 ARW	16060355
86-88 S108(03)(2.8R) W/MT 'MC9 M73) ALT ZW9	0363 ASX 7374 SJ 7374 ASX	16060362
86-88 T-1(2.8R) W/AT (MDS) (EXC CALIF NM-8 EXP)	0376 ASP	16060366
86-88 S1(2.8R) W/MT (ML-3) FED ALT (EXC NM8 EXP)	0370 ASD	16060369
86-88 T1(2.8R) W/MT (ML-2) FED ALT. (EXC NM8 EXP)	0370 ASB	16060339
86-88 ST-1(2.8R) W/MT (ML-2 ML-3) 3.08R 342R 373R FED ALT (EXC NM8)	0375 ASA	16060373
86-88 ST-1(2.8R) W/MT (MC-9 M73) CALIF	7330 RF 7330 ARZ 0378 ARZ 04151 FJN	16060377
86-88 ST-1(2.8R) W/AT (MDS) CALIF 8 EXPORT	7326 RD 7326 ARY 0382 ARY	16060380
86 ST1(2.8R) W/MT (MC9 M73) EL3 FED ALT	4143 FTL	16060385
86-87 ST1 2.8R W/MT (MC9 M73) FED ALT (EXC NM8 EXP)	7302 RL 7302 ARX 0386 ARX	16060385
86 ST-1(2.8R) W/MT ML-3 (4:11R) (4) ALT (NA6) EL3 (EXC NM8 EXPORT)	4165 ALJA	16074664
88 S1 0353 2.8R W/MT ML-3 3.73R (GT4) 3.08R (LUG) CALIF NB2 EL3	4670 ACJB	16074668

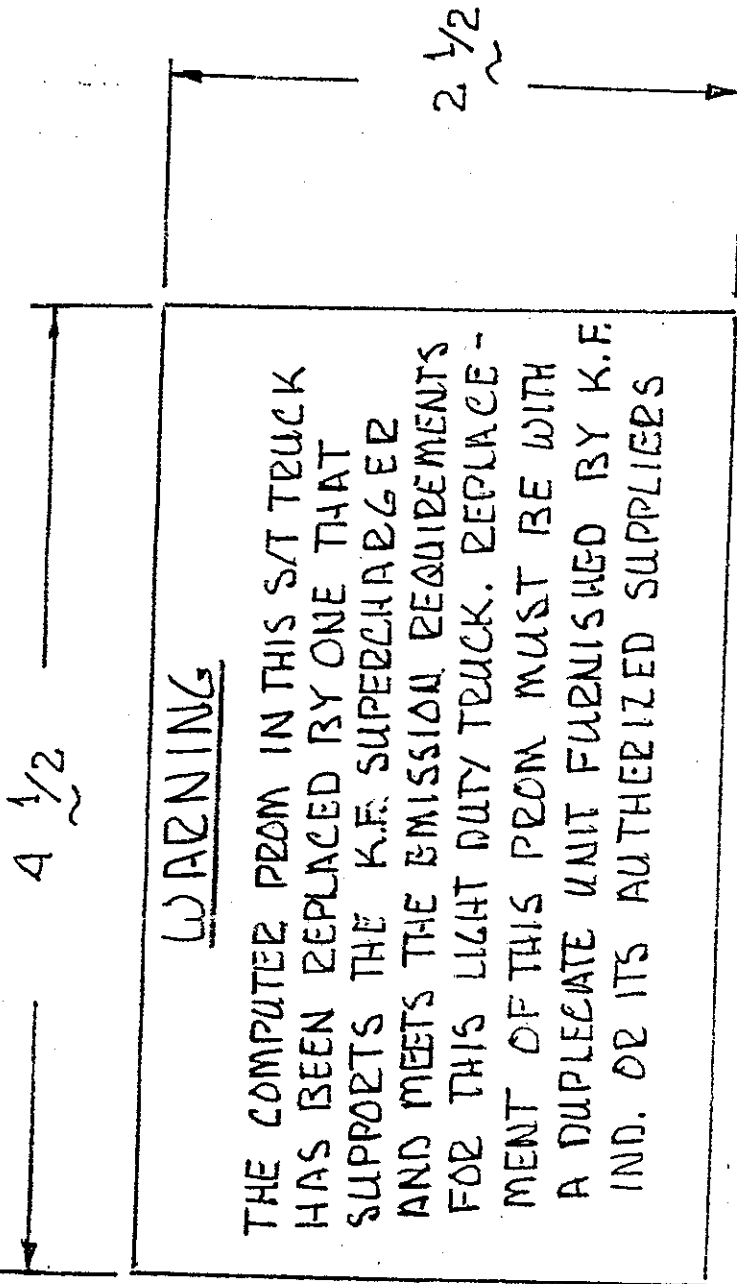
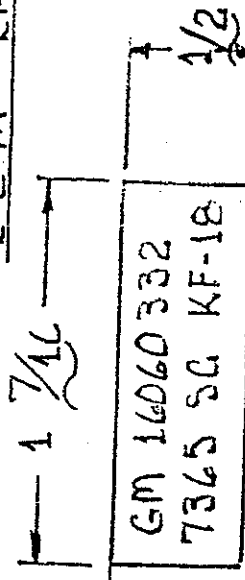
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ST TRUCK APPLICATION	CALIBRATOR FROM NO.	GM CONTROLLE.
88 S-1(14)(2.82) W/MT (ML-3) CALIF (NB2)	4675 ACJC	16074674
88 S-1(2.82) W/AT (MDB) FED (NA5) NA6 (EL3) EXC NMB EXPORT	4635 ACJT	16074634
88 S-1(2.82) W/MT (ML-3) 3.73R (GT4) 3.42R (GU6) FED ALT (NA6) (EXC EXPORT)	4660 ACJZ	16074658
88 S-1(2.82) W/AT (MDB) CALIF (NB2)	4690 ACJH	16074688
88 S108 (03)(2.82) W/AT (MDB) ZW9 EXC (NMB EXPORT)	4645 ACJX	16074644
88 T-1 (0353) 2.82 W/AT (MDB) FED (NA5) ALT (NA6)	4717 ACJM	16074716
88 T-1 16 (2.82) W/AT (MDB) FED (NA5) ALT (NA6) (EXC NMB EXPORT)	4680 ACJD	16074678
88 T-1 (2.82) W/MT (ML-2) CALIF (NB2)	4675 ACJC	16074674
88 T-1 (2.82) W/AT (MD-8) CALIF (NB2)	4685 ACJF	16074684
86-88 ST-1 2.82 W/MT ML-2 ML-3 3.42R 3.73R FED (NA5) ALT (NA6)	7335 RH 7335 ASA	1228542
86-88 ST-1 (2.82) W/MT (ML-9 M 73) FED ALT (EXC NMB)	8386 ARX 4143 FJL 7302 RC 7302 ARX	1228541
86-88 S-1 (2.82) W/MT (ML-3) FED ALT (EXC NMB EXP)	7340 RJ 7340 ASB	1228543
86-88 S-1 (2.82) W/AT (MDB) E63 (EXC CALIF NMB EXPORT)	7297 RB 7297 ARW	1228544
86-88 T-1 (2.82) W/MT (ML-2) FED ALT (EXC NMB EXPORT)	7340 RJ 7340 ASB	1228543
86-88 T-1 (2.82) W/AT (MDB) (EXC CALIF NMB EXPORT)	7369 SH 7369 ASP	1228545
87-88 T-1 2.82 W/AT MDB (EXC CALIF NMB EXP)	7297 RB 7297 ARW	1228544

- NA5 — FEDERAL EMISSIONS
 - NA6 — EMISSIONS ALL ALTITUDES
 NB-2 — EMISSIONS CALIF.
 GT 4 — 3.73 AXEL RATIO
 GU 6 — 3.42 AXEL RATIO

VEHICLE APPLICATION CODE

CODE	DISCRIPTION
S-1	TWO WHEEL DRIVE
T-1	FOUR WHEEL DRIVE
ST-1	
S108 03	FLEETSIDE PICK UP
E63	PICK UP BODY
ZW9	CAB & CHASSIS ONLY
CALF	CALIFORNIA EMISSIONS
FED	FEDERAL (49 STATE) EMISSIONS
ALT	HI ALTITUDE EMISSIONS
ML-2	TRANSMISSION 5 SPEED
ML-3	TRANSMISSION 5 SPEED
ML-9	TRANSMISSION 4 SPEED (BERG WARNER)
M-73	TRANSMISSION 4 SPEED (ISUZU)
MD-8	TRANSMISSION 700 R4 OVERDRIVE
NM-8	
MD-2	TRANSMISSION

ECM LABELPROM LABEL